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Effect of Irrigation Intervals on Vegetative Growth and Yield of Two Cultivars of Eggplant

Hassan A.Hussein[1]; Kotb A. Farghaly[2]; Aimen K. Metwally[1] and Mahroos. A. Bahawirth[3]
[1]Dept. Hort.,Fac.Agric.,Assiut Univ.Egypt.
[2]Dept. Botany Fac.,Sci. Assiut Univ.Egypt.
[3]Dept.Biology, Fac.Sci.Hadramaut Univ.,Yemen

Abstract

This investigation was carried out at the Experimental Farm of Assiut University during 2007/2008 and 2008/2009 seasons to study the effect of irrigation interval on growth and yield of Balady and Black Beauty eggplant cultivars .On the base of water requirements for the eggplant crop , the amount of watering was calculated from 4750 m^3 /fed. Along 145 days present the eggplant growing season i.e.0.1m^3 /$m^2$and applied at 12,18,24 and 30 days intervals. Black Beauty cv. showed a significantly higher root fresh weight , early and total yield per plot and per feddan in both seasons of the study as an average of all tested irrigation interval. Irrigation interval showed a significant effect on total yield as 12 day irrigation interval resulted in higher root fresh weight and total yield. Early yield did not show significant response to irrigation interval. Longer irrigation intervals significantly shortened the period to the first flower . This response was more clear in Black Beauty cv. than Baladay cv. Irrigation every 12 days gave high significantly the highest values of stem length and the greatest number of branches per plant in the two cultivars in both seasons.

Key words: Eggplant, water stress, irrigation interval, yield.

Introduction

Water stress is one of the major environmental constraints in plant growth and development. The main consequences of water stress is decreased growth and development caused by reductions of leaf area, dry matter production, plant water status , and transpiration (Gupta *et. al.* (2001) ; Chaves *et. al.* (2002) ; Bindi *et. al.* (2005)) .The effects of water stress vary between plant species Hsiao and Xu (2000) ; Silvestre and Ferreira (2000)) showed that plants are affected with various ways from water stress according to growth periods (Ozenc and Ozkan (2003) ; Deproost *et. al.* (2004) ; Font *et. al.* (2005)) . Schachtman

and Goodger (2008) reported that chemical signals are important for plant adaptation to water stress. As soils become dry, root -sourced signals are transported via the xylem to the leaves and result in reduction in water loss and leaf growth.

Eggplant is one of the most popular vegetables in many parts of the subtropical regions As eggplant's fruit contains low calories , they are regarded as a healthy food by many dietitians . They also sepresent good sources of Vitamin C, Potassium and Calcium. One hundred of fresh fruit flesh contain around 24 calories, 1 gram of protein, zero fat, zero cholesterol and 239 milligrams of sodium.

Jin *et. al.* (2000) reported that soil osmotic-stress, which closely correlats with drought, has an impact on growth of both the shoot and the roots of tomato. However, growth of the shoot is affected to a greater extent than that of the roots.

Ozenc (2008) grow tomato seedlings under three water levels (100%, 50% and 25% of easily available water content) in different compost mixes under greenhouse conditions. Water-deficit stress negatively affected seedling growth and transpiration rate. When water deficiency level increased, transpiration rate is decreased. Therefore, plant growth slowed down and the total dry matter content of seedlings and plant height decreased.

Behboudian (1977) compared with some other vegetables reported that, leaf pressure potential ψ_p and relative water content of leaf (RWC) remained higher in droughted eggplant. This species also has a better stomatal control on transpiration. There was an after-effect of drought on the stomata. In recovery treatment, ψ_p values exceeded those of the control. This may have functional significance in resumption of growth after stress is alleviated.

Sarker *et. al.*(2005) reported that under short and long-term stress conditions, eggplants synthesized significantly high amounts of proline, but in contrast the net photosynthesis remained less affected and maintained its activity. Such results suggested that proline synthesis increases during stress and returns to the initial level after stress recovery, which seems to act as part of a survival mechanism. Therefore, eggplants (*Solanum melongena* L. cv. Senryo No. 2) have an adaptive potential to acclimate under stress conditions.

Ismail *et. al.*(2002) found that irrigation withholding for 9 days (gradual decreasing in water content) of two sweet pepper cultivars resulted in earlier inhibition of leaf growth in cv. Bellboy' compared with cv. 'Cili Padi'.

Rodríguez *et.al.* (2010) reported that water stress strongly affects horticultural cultivars by reducing yield and fruit quality. Also the physiological functions of the plant are altered by this stress reducing due to the formation of reactive oxygen species and water relationships.

Wudiri and Henderson (1985) reported that tomato cv.'Saladette', was performed better then 'VF145B-7879' under water stress because of its ability to roll its leaves under high evaporative demand, thereby maintaining with high leaf water status as a sort of drought avoidance.

Abbas (2007) studied the effect of three irrigation intervals (4,8 and 12 days) on eggplant in Iraq and found that irrigation every 8 days during the growing season significantly increased plant height and the number of main branches per plant. Moreover, the mean fruit weight and plant yield were significantly increased with the treatment of 8 days interval of irrigation.

The objective of the present work is to determine the best water needs, and the best plant response to water stress as well as know the effect of physiological characteristics of the crop under water stress conditions, identifying the mechanical plant resistance (morphological and anatomical) and to select the best varieties (growth and yield) under conditions of water stress.

Materials and methods

This study was carried out at the Experimental Farm of Faculty of Agriculture , Assiut University , Assiut ,Egypt during 2007 and 2008 seasons. The study aimed to find out the performance of growth and yield of two cultivars (Balady and Black Beauty) of eggplant grown at different irrigation intervals (12,18,24 and 30 days).

Plant material preparation

Eggplant seeds were sown in the nursery at 15/1/2007 and 20/2/2008 in the first and second season, respectively. Transplanting took place on 19/4/2007 and 29/4/2007 in the first and second season, respectively. Transplants were arranged on ridges 80 cm apart with 50 cm spacing between plants in the experimental plots. Experimental plot area was 9 m^3, Except for irrigation normal cultivation practices were applied as recom-

mended (for common) in all fields.

Normal practices for transplant establishment were adapted following the usual recommend for eggplant crop.

Soil preparation

Land preparation included plowing to a depth of 30 cm and rotovating to a fine tilth to break up clods and to smooth the soil surface of the ridges. Before cultivation and during soil preparation one third of the recommended N, P and K fertilizers were added to the experimental plots at the rate of 45 kg N, 30 kg P_2O_5 and 40 kg K_2O per fed in each season .The experimental field was irrigated so as to stabilize the ridges. Other agricultural practices of pest and weed control and others were applied .

Water quantity calculation:

Water quantity was calculated on the base of water requirements for the eggplant crop (F.A.O. publications). Water requirements for eggplant crop under furrow irrigation conditions is 4750 m^3 /fed. When the growth season is 145 days and the irrigations along the season is usually applied eared 12 days, This mean that the recommended irrigation interval is 12 days, and by dividing the water quantity in each irrigation as 4750 m^3 /12 we obtain 395.8 m^3 /fed. in each irrigation

Water quantity in each irrigation for one meter ^{2} = 395.8 /4000 = .0989 m^3/m^2

Water quantity in each irrigation for one plot = 0.0989 x 9 m^2 = 0.89 m^3 / m^2

Irrigation intervals ,number of irrigations and water quantities added along the growing season are presented in Table 1.

Table 1 : Number of irrigations total water quantity along the growing season in Balady and Black Beauty cvs of eggplant during 2007 and 2008 seasons..

Irrigation interval days	Number of irrigation	Water quantity per one irrigation	Water quantity per plot during season
12	12	0.9 m^3 /plot	10.8 m^3
18	8	0.9 m^3 /plot	7.2 m^3
24	6	0.9 m^3 /plot	5.4 m^3
30	4	0.9 m^3 /plot	3.6 m^3

The amount of water applied for each irrigation was according to Ministry of Agriculture, Laboratory Center Climate and added using a meter to control the quantity of water irrigation.

Experimental design

The applied experimental design was split plot with 3 replicate. The cultivars contributed as the main plot while irrigation intervals were randomly distributed to the sub-plots.

Recorded data

I- Vegetative characters:

After 63, 97 and 131 days from transplanting and prior to irrigation (in both seasons), the following data were recorded on 3 randomly labelled plants and averaged to calculate:

1- Average stem length (cm): Measured from the cotyledonary node to the growing apex of the main stem .

2- Average number of branches /plant: All formed branches on the main stem were counted.

3- The recovered fresh roots : Samples (after 131days from transplanting) of resent active three plants from each plot were taken at each planting date and root system was digged to the depth of 50 cm. Roots were gently recovered by agitating root systems in plastic containers filled with tap water (Farghali, 1994). Average root fresh weight was measured, at the end of the growing season.

II- Earliness of flowering (days): Number of days from transplanting to the first flower observed in each plot.

III-Fruit yield :

1-Early fruit yield (ton/fed.): Fruits Picked during the first 15 days of picking season were weighed and the early yield per fed was calculated.

2- Total yield (ton/fed): Total picked fruits /plot during the whole harvesting season were weighed and the total yield per fed. was calculated.

3- At the last sample (131 days after transplanting)three representative plants and prior to irrigation were taken from each plot at each planting date by digging the soil and roots at the depth of 50 cm. .Roots were gently recovered by agitating root system in plastic containers filled with tap water (Farghali, 1994) . Average root weight was measured .

Statistical analysis:

The obtained data of both seasons were subjected to statistical analysis according to Snedecor and Cochran (1980) and means of treatments were compared using Least Significant Differences (L.S.D.) at 5 %

Results and Discussion

1- Average stem length /plant (cm)

As shown in Table 2, average stem length was obviously affected by irrigation interval all over the sampling period. This was true in both tested cvs and seasons of the study. However, as average of sampling period and irrigation interval ,the plants of the Balady cv. were significantly longer than Black Beauty cv. For both cvs, there were an increase in plant length as progressed in age. However , stem length was greatly affected by irrigation in-

terval. As an average of the two cultivars and sampling dates ,it was observed that as irrigation interval prolonged a reduction in stem length took place with significant differences among irrigation intervals. Irrigation every 12 days recorded the highest results while the lowest results, were recorded when irrigation was applied at 30 days. On line with the presented results Byari and Al-Sayed (1990) reported that increasing the water deficit decreased plant height, significant difference were found among tomato cultivars under water deficits for plant height. Omvugbuta-Enyi (1996) reported that plant height of okra *(Abelmoschus esculentus)* was significantly reduced by water stress. Also, Abbas (2007) studying the effect of three irrigation intervals (4, 8 and 12 days) on eggplant in Iraq, found that, irrigation every 8 days during the growing season increased plant height of eggplant. Ozenc (2008) in tomato concluded that water stress at 50 and 25 % of easily available water content of soil resulted in slower plant growth and shorter plants. Plant height was the highest in 100% irrigation and decreased depending on the level of water stress.

2- Average number of branches/plant

Data presented in Table3 indicate that differences between culivars regarding average number of branches / plant were insignificant during 2007 season while during 2008 season plants of Balady cv. had significantly greater number of branches per plant. Also, it could be observed that, (as an average of both cultivars all over sampling period) the average number of branches /plant was significantly affected by irrigation interval. The greatest number of branches /plant was formed when irrigation was applied each 12 days while the least was recorded when irrigation was done at 30 days intervals. Insignificant irrigation x cultivar interaction was found in number of branches /plant. However, significant irrigation x sampling time interaction effect regarding number of branches/plant was found. The highest number of branches per plant was found by irrigation every 12 days.

Our results were confirmed the findings of Abbas (2007) in eggplant who reported that irrigation every 8 days during growing season significantly increased the number of main branches per plant compared with 4 and 12 day irrigation interval.

3- Average recovered root fresh weight/plant (kg)

Data presented in Table 4 indicat that average root fresh weight was significantly affected by irrigation interval in both cultivars during 2007 and 2008 seasons. It could be noticed that root mass detected in plants of the Black Beauty cv. was significantly greater than the corresponding one found in plants of the Balady cv. As an average of both cultivars there was a noticeable reduction in fresh root mass as irrigation interval became longer. The greatest root weight was found as irrigation was applied at 12 days interval while the lowest values in this respect was recorded as irrigation was applied every 30 days .This was true in both seasons of study. Generally, over both seasons of study the Black Beauty revealed the greatest root mass as expressed in higher average root fresh weight /plant when watered every 12 days. Zhang *et al.* (2005) reported that plants grown under dry climate had lower stem length, transpiration and total biomass, but higher root/shoot ratio of plants. Xu *et al* (2006) explained that water stress significantly improved R/S ratio of three grass seedlings. Ozenc (2008) reported that, regarding root/shoot ratio as one of the growth parameter, water stress limited shoot growth more than root growth. This means that moving of soluble nutrient elements decreased through shoot.

Table 4 :Root weight (kg) per plant in eggplant cvs. Balady and Black Beauty as affected by irrigation interval during 2007 and 2008 seasons.

Cv Irrig. / Inter (days)	2007			2008		
	Balady	Black Beauty	Mean	Balady	Black Beauty	Mean
12	1.40	1.66	1.53	1.21	1.41	1.31
18	1.04	1.26	1.15	0.86	1.04	0.95
24	0.82	1.03	0.92	0.61	0.87	0.74
30	0.50	0.84	0.67	0.43	0.65	0.54
Mean	0.94	1.20	1.07	0.78		
L.S.D. 0.05	Cv= ns Irri.= 0.06 Cvx Irri= ns			Cv= ns Irri.= 0.07 Cvx Irri = 0.10		

Kulkarni and Phalke (2009) tested the effect of two water levels (normal and in 50% water application as water deficit condition) on root growth of okra. At harvest, water-stressed plants had 21% lower root dry weight mass but higher root/shoot ratio. Sarker *et.al.* (2005) reported that eggplant biomass yield was significantly decreased under water stress
as the moisture stress retarded the physiological functions.

4-Earliness of flowering (days)

As shown in Table 5, the two tested cvs of eggplant responded differently to the effect of irrigation interval regarding number of days to flowering .Black Beauty cv. flowered earlier in both seasons of study. The longer irrigation interval enhanced earlier flowering. The latest to flower were plants irrigated every 12 days in both cultivars in both seasons of study . No significant effect was detected for the cultivar x irrigation interaction on the earliness of flowering . However, for each of the tested cultivars , there was a decrease in number of days to flowering as irrigation interval prolonged .The earliest to flower was Black Beauty cv.when irrigated every 24 or 30 days in 2007 and 2008 seasons ,respectively. This is true as the plants were under unverable conditions, then they accelerate in flowering and forming the seeds early to keep their kind.

Table5 : Days to the first flower observed in Balady and Black Beauty cvs of eggplant as affected by irrigation interval during 2007 and 2008 seasons.

Cv.Irrig. / Inter (days)	2007			2008		
	Balady	Black Beauty	Mean	Balady	Black Beauty	Mean
12	65.7	63.0	64.3	62.0	59.6	60.8
18	62.7	60.0	61.3	60.1	57.8	58.9
24	56.7	54.7	55.7	55.9	52.7	54.3
30	56.3	55.0	55.7	53.9	51.8	52.8
Mean	60.3	58.2	59.3	58.0	55.4	56.7
L.S.D. 0.05	Cv= ns Irri.= 2.90 Cvx Irri = ns			Cv= ns Irri.= 3.30 CvxIrri = ns		

5-Early fruit yield (ton/fed.)

Table 6 represent data for early fruit yield in the two tested eggplant cultivars as affected by irrigation interval during 2007 and 2008. It could be noticed of that the Black Beauty cv. significantly surpassed Balady cv. re-

garding producing early fruit yield as an average of the tested two cvs. Irrigation interval did not significantly affect the early fruit yield. However, significant cv x irrigation interval interaction effect was found on early fruit yield during 2007 season, Balady cv. produced the highest early yield as irrigation was applied at 18 days interval while Black Beauty cv. produced the highest early fruit yield when irrigated at monthly intervals.

6- Total yield (ton//fed)

Data presented in Table 6 show that the total fruit yield in the two tested eggplant cvs

Table 6 : Early and total yield(ton/fed.) in Balady and Black Beauty cvs. of eggplant as affected by irrigation interval during 2007 and 2008 seasons.

Cv.Irrig. / Inter (days)	Early yield			Total yield		
	Balady	Black Beauty	Mean	Balady	Black Beauty	Mean
	2007 season			2007 season		
12	5.818	8.193	7.005	18.447	39.000	28.723
18	7.104	11.516	9.310	16.557	30.773	23.665
24	6.041	10.355	8.198	15.623	29.813	22.718
30	5.543	16.992	11.267	15.127	17.900	16.513
Mean	6.126	11.764	8.945	16.438	29.372	22.905
L.S.D 0.05	Cv= ns Irri= ns cvxirri= 4.57			Cv= ns Irri= 7.0 cvxirri= ns		
	2008 season			2008 season		
12	5.263	4.459	4.861	15.740	33.030	24.385
18	4.200	4.252	4.226	13.200	23.747	18.473
24	3.630	3.630	3.630	9.803	20.897	15.350
30	2.489	4.319	3.404	8.507	14.717	11.612
Mean	3.895	4.165	4.030	11.812	23.098	17.455
L.S.D 0.05	Cv= ns Irri= ns CvxIrri = ns			Cv= ns Irri= 5.60 CvxIrri= ns		

was affected by irrigation interval during both seasons of study. It is clear that Black Beauty cv. gave significant by higher fruit total yield than Balady cv. in both seasons of study. Irrigation interval had a pronounced effect on total fruit yield as the wider the irrigation interval has the lower in the total fruit yield . For each of the tested cultivars, the highest total fruit yield was obtained when irrigation was applied at 12 day intervals. However, for a given cultivar, there was adescending manner of total fruit yield as irrigation interval was longer. The interaction cultivar x irrigation

interval was not significant in both season of study. However, within each of the tested two cultivars there was a reduction in the total yield as irrigation interval was prolonged, Significant effect was more pronounced with Black Beauty cv. This was true during both seasons of study. Generally, this could explained under irrigation interval of 12 days the availability of water requirements as well as nutrients for the plants are better . So, this might be reflected upon better plant growth and longer harvesting period resulting in higher total fruit yield.

Mbagwu and Adesipe (1987) reported that water stress lowered okra yield as the greatest percentage reduction in fresh fruit yield occurred when moisture stress was imposed at the flowering stage of 'Kano Dwarf' and 'Awgu Early' and the pod-filling stage of 'Lady Finger'. In all the lasted cultivars, moisture stress at both the flowering and pod-filling stages resulted in a reduction of more than 70% in fruit yields, while the lowest reduction in fruit yield occurred with moisture stress during the vegetative stage. Dugo *et.al.* (2007) found that pepper dry fruit weight at harvest under water deficits throughout the season was 66% of the weight of fruits of treatment which fully irrigated. Also, Sankar *et. al.* (2008) found that drought stress decreased the biomass and yield, leaf area duration, cumulative water transpired, net assimilation rate, mean transpiration rate and harvest index in five okra varieties . Among these varieties, variety JK Haritha showed the best results.

Abbas (2007) under Iraq conditions reported that the mean fruit weight and plant yield in eggplant were significantly increased with the treatment of 8 days irrigation to 178.63 kg/plant and 61.22 t/h. compared with the other intervals 4 and 12 days.Jaimez *et.al.*(1999) found that fruit production in three cultivars of sweet pepper (*Capsicum chinense* Jacq) under the conditions of tropical semiarid region was affected in different degrees depending on the cultivar (from 24% up to 40% reduction between irrigation interval 3 and 6 day). Wudiri and Henderson (1985) reported that smal effects of water stress on the reproductive processes of tomato plant were more pronounced in 'VF145B-7879' than in 'Saladette'. As severe water stress 25% ET (evapotranspiration) reduced fruit set by more than 90% in 'VF145B-7879' com-

pared with a reduction of 40% in 'Saladette'. Gadissa and Chemeda (2009) tested three irrigation levels (50, 75 and 100% of ET_c) A 50% reduction in irrigation level caused a reduction in yield of about 48.3 and 74.4% under the normal and paired-row planting methods, respectively, whereas, a 25% reduction in irrigation level caused a reduction in yield of about 22.8 and 47.7% under the same planting methods.

References

Abbas, J.A. 2007. Effect of Potassium Fertilization and Irrigation Intervals on Growth and Yield of Eggplant (*Solarium melogena* L). Jordan J.Agric., Sci. 3 (3): 350-361.

Byari, S.H. and Al-Sayed, A.R. 1990. The influence of differential irrigation regimes o five greenhouse tomato cultivars. 1-The influence of differential irrigation regimes on vegetative growth. Egyptian J. of Hort. 26 (2): 109-125.

Behboudian, M.H. 1977. Responses of eggplant to drought. I. Plant water balance. Scien Hort. 7, (4): 303-310.

Bindi, M.; S. Bellesi ; S.Orlandini;L. Eibbi; M. Moriondo and T. Sinclair. 2005. Influence of water deficit stress on leaf area development and transpiration of Sangiovese grown in pots. Amer. Jour. of Enology and Viticulture, 56 (1): 68-72.

Chaves, M. M., J. S. Pereira, J.,Maroco, M. L. Rodrigues, C. P.P. Ricardo, M. L. Osorio, I. Carvalho, T. Faria and C.Pinheiro. 2002. How plants cope with water stress in the field. Photosynthesis and growth. *Ann. of Bot.* 89, 907-916.

Deproost, P., F. Elsen and M. Geypens. 2004. High yields of mechanically harvested snap beans as induced by moderate water stress during flowering. *Acta Hort.*,(ISHS) 664:205-212.

Dugo, V.G., F. Orgaz and E. Fereres. 2007. Responses of pepper to deficit irrigation for paprika production. Scien. Hort. 114, (2): 77-82.

Farghali, M.A. 1994. Effect of plastic mulches on off season eggplant production. Assiut J. of Agric. Sci. 25 (3): 97-112.

Font, L., F. Korosi and I. Farkas. 2005. Leaf inclination based non destructive water stress indication for vegetables. *Acta Hort.*, (ISHS) 691(1):99-106.

Gadissa, T.and D. Chemeda. 2009. Effects of drip irrigation levels and planting

methods on yield and yield components of green pepper (*Capsicum annuum*, L.) in Bako, Ethiopia. Agricultural Water Management 96, (11), 1673-1678.

Gupta, N. K., S. Gupta and A. Kumar. 2001. Effect of water stress on physiological attributes and their relationship with growth and yield of wheat cultivars at different stages. *Journal of Agronomy & Crop Science*, 186,55-62.

Hsiao, T.C. and L.K. Xu. 2000. Predicting water use efficiency of crops. *Acta Hort.*, (ISHS) 537:199-206.

Ismail, M. R., W. J. Davies and M. H. Awad. 2002. Leaf growth and stomatal sensitivity to ABA in droughted pepper plants. Scien. Hort. 96, (1-4): 313-327.

Jaimez, R. E., F. Rada and C. García-Núñez. 1999. The effect of irrigation frequency on water and carbon relations in three cultivars of sweet pepper (*Capsicum chinense* Jacq), in a tropical semiarid region. Scien. Hort. 81, (3): 301-308.

Jin, S.C, C. S. Chen and A. L. Plant. 2000. Regulation by ABA of osmotic-stress-induced changes in protein synthesis in tomato roots. *Plant, Cell & Envi*, 23 (1), 51-60.

Kulkarni, M.and S. Phalke. 2009. Evaluating variability of root size system and its constitutive traits in hot pepper (*Capsicum annum* L.) under water stress. Scien. Hort.120, (2): 159-166.

Mbagwu, J.S.C and F.A. Adesipe. 1987. Response of three okra (*Abelmoschus esculentus* L.

Moench) cultivars to irrigation at specific growth stages. Scien. Hort. 31, (1-2): 35-43.

Omvugbuta -Enyi, J. 1996**.** Effect of water on germination and growth of okra (*Abelmoschus esculentus* L. Moench). Annals of Agricultural Research 17 (4): 393-396.

[C.F. Hort. Abst. 67, 4074].

Ozenc, D.B.2008. Growth and Transpiration of Tomato Seedlings Grown in Hazelnut Husk Under Water-Deficit Stress.Compost Science & Utilizatio .16, (2): 125-131.

Ozenc, B.D.and Ozkan. 2003. Effect of peat and perlite mixed with soil on growth of pepper plant (*Capsicum annuum* var. grossum cv. llB-14) under water stress. Ankara University, *Journal of Agricultural Science*. 9(3): 305 – 312.

Rodríguez, E. S. , M. R.Wilhelmi, L. M. Cervilla, B. Blasco, J. J. Rios, M. A. Rosales,L.

Romero and J. M. Ruiz. 2010. Genotypic differences in some physiological parameters symptomatic for oxidative stress under moderate drought in tomato plants. Plant Science 178, (1): 30-40.

Sankar, B, C. Abdul Jaleel, P. Manivannan, A. Kishorekumar, R. Somasundaram and R. Panneerselvam. 2008. Relative efficacy of water use in five varieties of *Abelmoschus esculentus* (L.) Moench. under water - limited conditions. Colloids and Surfaces B: Biointerfaces. 62,(1): 125-129.

Sarker, B.C, M. Hara and M. Uemura. 2005. Proline synthesis, physiological responses and biomass yield of eggplants during and after repetitive soil moisture stress. Scien. Hort ,103, (4): 387-402.

Schachtman, D. P. and J. Q.D. Goodger. 2008. Chemical root to shoot signaling under drought. Trends in Plant Science Jun;13(6): 281-287.

Silvestre, J. and M.I. Ferreira. 2000. Effects of irrigation on transpiration and water relations of vineyards, in the tejo valley (central portugal). *Acta Hort.*, (ISHS) 537(2):305-312.

Snedecor, C.W. and W.G. Cochran. 1980. Statistical methods. 6th ed. Iowa State Universtiy . Press, Ames, Iowa, U.S.A.

Xu, B. C, F. M. Li, L. Shan, Y. Q. Ma , N. Ichizen and J. Huang. 2006. Gas exchange, biomass partition, and water relationships of three grass seedlings under water stress. *Weed Biology and Management*, 6 (2): 79-88.

Wudiri, B. B. and D.W. Henderson 1985. Effects of water stress on flowering and fruit set in processing-tomatoes. Scien. Hort. 27, (3-4): 189-198.

Zhang, X., N. Wu and C Li. 2005.Physiological and growth responses of Populus davidiana ecotypes to different soil water contents. *Jour. of Arid Envir*, 60 (4) 567-579.

تأثير فترات الري علي النمو الخضري و المحصول لصنفين من الباذنجان

حسن أحمد حسين[1] ، قطب عامر فرغلي[2] ، أيمن قطب متولي[1]
محروس عبد الله باحويرث[3]
[1] قسم البساتين – كلية الزراعة –جامعة أسيوط – أسيوط – مصر
[2]قسم النبات – كلية العلوم - جامعة أسيوط – أسيوط – مصر
[3]قسم الأحياء –كلية العلوم – جامعة حضرموت للعلوم و التكنولوجيا – اليمن

تم إجراء البحث بمزرعة التجارب بكلية الزراعة – جامعة أسيوط - أسيوط - مصر خلال الموسمين الزراعيين 2007/ 2008 و 2009/2008 بهدف دراسة تأثير طول فترة الري علي نمو و محصول صنفي الباذنجان البلدي و بلاك بيوتي . تم حساب كمية المياه المستخدمة لري النباتات في كل مرة طبقا للاحتياجات المائية لنبات الباذنجان و المعلنة بواسطة منظمة الزراعة العالمية الفاو و مركز المناخ الزراعي – مركز البحوث الزراعية والمقدرة ب 4750 م3 / فدان على طول موسم نموه في 145 يوم .وقد تم تطبيق أربعة فترات للري هي كل 12- 18 – 24- 30 يوم .
أنتج الصنف بلاك بيوتي وزنا طازجا للجذر ، محصولا كليا و محصولا مبكرا أعلي معنويا من الصنف البلدي و ذلك تحت فترات الري المختلفة. أظهرت فترات الري تأثيرا معنويا علي الوزن الطازج للجذر و كمية المحصول الكلي حيث أعطت معاملة الري كل 12 يوما أعلي وزن طازج للجذر و محصولا كليا في حين لم تظهر فترة الري تأثيرا معنويا علي المحصول المبكر. فترات الري الأطول أدت إلي تبكير الإزهار(عدد الأيام لظهور أول زهرة علي النبات) و كان هذا التأثير أكثر وضوحا في الصنف بلاك بيوتي عنه في الصنف البلدي. كما أظهرت الدراسة أن صفات النمو الخضري تأثرت معنويا بفترة الري حيث أن الري كل 12 يوم أدي إلي تسجيل أعلي معدلات طول الساق و عدد الفروع للنبات في كلا الصنفين المستخدمين خلال موسمي الدراسة.